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Materials Support Stand**Field of the invention**

This invention relates to a materials support stand which may be used to support materials and equipment used in underground mining operations.

5 Background of the invention

Underground mining operations are frequently carried out in cramped and hazardous conditions and it is important that materials and equipment used in the operation are kept well ordered and readily accessible to ensure that the operation can be carried out as smoothly as possible. Modern mining techniques have increased the mechanisation of the mining operation and large underground mining machines are frequently employed to carry out many of the operations which were previously carried out by individuals using hand held equipment.

One modern advance is to provide a vehicle which carries out semi-automated roof bolting operations. The equipment carried on such vehicles is highly automated but workers are still required to change drill rods, insert roof bolts into the machine, and operate the apparatus. It is important that such workers have materials and equipment readily available to them so they are not inconvenienced having to locate items on the floor or the machine during the bolting operation or walk between the bolting apparatus and a storage facility.

Summary of the invention

According to the invention there is provided an equipment support stand adapted to be used on an underground mining machine which includes at least one apparatus thereon which will utilise a plurality of interchangeable items, said stand comprising:

a base adapted to stand on a surface of a said machine adjacent to said apparatus;

an upstanding rack mounted to said base, the rack being shaped and configured to hold and/or support said items; and

securing means for releasably securing said base to said surface; and wherein there are at least a pair of arms aligned generally side by side with each other and defining a space therebetween in which said items can be located.

According to another aspect of the invention there is provided an equipment support stand adapted to be used on an underground mining machine which includes at least one apparatus thereon which will utilise a plurality of interchangeable items, said stand comprising: a base adapted to stand on a surface of a said machine adjacent to said apparatus; an upstanding rack mounted to said base, the rack being shaped and configured to hold and/or support said items; securing means for releasably securing said base to said surface; and said equipment support stand is adapted to be coupled back to back with another stand to provide for double storage capacity.

According to another aspect of the invention there is provided an equipment support stand adapted to be used on an underground mining machine which includes at least one apparatus thereon which will utilise a plurality of interchangeable items, said stand comprising: a base adapted to stand on a surface of a said machine adjacent to said apparatus; an upstanding rack mounted to said base, the rack being shaped and configured to hold and/or

support said items; securing means for releasably securing said base to said surface; and including one or more pegs projecting upwardly at an inclined angle to the horizontal, said pegs adapted to support annular items or items having holes or bores therethrough.

According to another aspect of the invention there is provided an equipment support stand adapted to be used on an underground mining machine which includes at least one apparatus thereon which will utilise a plurality of interchangeable items, said stand comprising: a base adapted to stand on a surface of a said machine adjacent to said apparatus; an upstanding rack mounted to said base, the rack being shaped and configured to hold and/or support said items;

securing means for releasably securing said base to said surface; said securing means comprises a plurality of clamps which incorporate a hook formation adapted to pass through an aperture in said surface of said machine and hook beneath said surface to thereby rigidly fix the support stand to the surface.

The upstanding rack may comprise a frame having one or more arms projecting laterally therefrom to at least one side thereof, said items in use being held in position by said arms. Preferably there are at least a pair of arms aligned generally side by side with each other and defining a space therebetween in which said items may be located.

The equipment stand may be adapted to be coupled back to back with another stand to provide for double storage capacity as well as to provide access from at least two sides.

Optionally the stand may include one or more magnetic clamps for holding ferrous metal items to the stand. The stand may include one or more pegs projecting upwardly at an inclined angle to the horizontal, said pegs adapted to support annular items or items having holes or bores therethrough.

The securing means may comprise a plurality of clamps which incorporate a hook formation adapted to pass through an aperture in said surface of said machine and hook beneath said surface to thereby rigidly fix the support stand to the surface. The hook formation may be tensionable by an over centre locking lever connected thereto which, when tensioned, will tightly clamp the stand to the surface.

Various embodiments of the invention are described below by way of examples. In the descriptive references made to the accompanying drawings but these specific features shown in the drawings should not be construed as limiting on the invention.

When used in this specification, the term "comprises" or "comprising" should be interpreted inclusively rather than exhaustively or exclusively.

Brief description of the drawings

Figure 1 shows a perspective view of a mining machine having an equipment stand according to the invention mounted thereon.

Figure 2 shows a perspective view of a first embodiment of equipment stand according to the invention.

Figure 3 shows a side view of equipment stand shown in figure 2.

Figure 4 shows a perspective view of a second embodiment of an equipment stand according to the invention.

Figure 5 shows a side view of the stand shown in figure 4.

Figure 6 shows two equipment stands similar to that shown in figure 4 mounted together in back to back arrangement.

5 Detailed description of the embodiments

Referring initially to figure 1, a mining machine 10 is shown having a platform 12 which is supported on a pair of endless drive tracks 14 and which carries a series of bolting rigs 16 on the forward end thereof for installing roof and rib bolts in a mine entry. A pair of temporary support members 18 are adjacent to the bolting rigs 16. Power and control apparatus indicated generally at numeral 20 is mounted towards the rear of the platform 12 and a removable storage pod 22 is also mounted towards the rear of the platform. The storage pod 22 has compartments 24 therein into which various consumable items such as roof and rib bolts, washers, resin capsules and the like will be stored. In addition, the machine will carry a supply of replacement drill rods so that the drilling operations and bolting operations can be carried out in a relatively uninterrupted fashion.

Each of the drill rigs 16 has a control station 26 associated therewith for controlling the drilling and bolting operations.

The platform 12 defines a generally flat work area 28 and operators will stand on the work area 28 to operate the individual control stations 26 for the bolting rigs 16. Preferably the work area 28 is formed from a welded or expanded metal mesh material, as is commonly used for work platforms.

To assist the operators it is necessary to have consumable items and other materials and equipment used in the bolting and drilling operation close at hand. Individual operators will generally want the equipment and materials for which they are responsible arranged in a particular fashion and located immediately adjacent to them whilst they are standing at the operator stations 26 so the operators do not need to move back to the storage pod 22 or storage tables 30 located above the drive apparatus 20 each time an item of equipment is required.

To assist the operator an equipment stand, indicated diagrammatically in figure 1 at numeral 32 is provided. Generally there will be an equipment stand 32 associated with each of the operator stations 26 and those equipment stands 32 will be positioned by individual operators so as best to suit their individual mode of operation. Although in figure 1 only a single equipment stand 32 is shown it is envisaged that there will be at least three equipment stands on the platform 12 and possibly four such stands.

Embodiments of the stand are shown in more detail in figures 2 to 6 of the drawings. Referring initially to figures 2 and 3, an equipment stand is shown having a base 36 which has a lower compartment 38 mounted thereto and an upstanding rack 40 extending vertically thereabove. Rack 40 comprises a pair of uprights 42 which terminate in a cross piece 44 at the upper end of the rack. A pair of arms 46 project forwardly from the cross piece 44 and provide a space 48 into which rib bolts and the like may be supported and retained. A chain 50 is provided for retaining bolts within the space 48. The lower end of the bolts will locate in the bin 38. Towards each side of the rack is a U-shaped bracket 52 shaped to accommodate a drill rod therein. The lower end of the drill rods will locate in square sockets 54 secured to the base of the stand.

a Three wedge or other shaped hooks 56 are mounted to the base 36 and are connected to over ^{center} ~~center~~ locking clamps 58. The hooks 56 are adapted to locate below platform 12 to secure the stand in position. Platform 12 will generally have a mesh or like covering material and the hooks 56 will locate below that mesh. The over centre clamps 58 will then be used to tension the hooks 56 pulling the wedged shaped end up against the underside of the mesh. With the three hooks tightly clamped in position the stand will be securely held and therefore will not fall over during bolting operations or whilst the machine is being moved from one location to another.

Turning now to figures 4 and 5 of the drawings, a similar stand is shown and this stand includes a rectangular shaped bracket 60 at the upper end of the frame 62, the bracket 60 being similarly shaped to the bin 64. The bracket 60 and bin 64 are in alignment with each other so that a rectangular slot is provided which is adapted to receive a box of resin capsules. The box will be retained in position by the bracket 60 and individual resin capsules can be removed from the box from upper end thereof as and when required for bolting operations. The stand shown in figure 4 includes three arms or pegs 66 which extend upwardly from the rack 62 and provide pegs on which items such as washers, nuts, butterfly plates and other items of annular configuration or which have holes therethrough, can be located and held in position on the rack. It will be noted that each of the pegs 66 is upwardly inclined to ensure that items located thereon do not inadvertently become dislodged as the machine vibrates in use or moves around.

The stand shown in figures 4 and 5 is shown having a pair of side by side drill rod retaining brackets 68, each of which has a magnetic clamp 70 associated therewith. The drill rods will be placed into the rectangular sockets 72 and upper end of the drill rods will be clamped in position by the magnetic clamps 70. It is envisaged that the magnetic clamp 70 will comprise rare earth magnets which will ensure that a reasonably high force of attraction exists between the magnetic clamp and the drill rod. It will be a simple matter to remove the drill rod from the bracket 68 by pulling on it and therefore this will provide a relatively quick arrangement for retaining drilling rods in position on the stand yet having the drill rods readily available for use as and when required.

Turning now to figure 6, two of the stands are the type shown in figures 4 and 5 have been joined together back to back to provide a larger capacity stand which can be used from opposite sides thereof. The stand includes clamps 74 for clamping a combined stand in the centre of the platform 12 adjacent to the two central bolting rigs 16. A combined stand shown in figure 6 has many of the features of the stand that is shown in figures 4 and 5.

Clearly, for different mining operations, different features may be required on the stands. The quick and simple arrangement by means of which the stand is securely clamped to a platform is considered to be advantageous particularly since it allows the stand to be moved from one location to another location on the platform without the use of special tools or the like. Clearly other forms of hook arrangements might be used if the wedged shaped arrangements as shown in the drawings are not suitable for a particular platform configuration.